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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/765,995	01/19/2001	David Alumot	002187 USA/C03/PDC/WF/DB	1810

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APPLIED MATERIALS, INC.
2881 SCOTT BLVD. M/S 2061
SANTA CLARA, CA 95050

EXAMINER	
MILLER, MARTIN E	
ART UNIT	**PAPER NUMBER**
2623	16

DATE MAILED: 12/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)	
	09/765,995	ALUMOT ET AL.	
	Examiner	Art Unit	
	Martin Miller	2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 August 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *96-105* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *96-105* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed August 25, 2003 have been fully considered but they are not persuasive. In response to applicant's argument that incorporation of the Yamashita comparator into the Ohtombe apparatus would substantially change the principle of operation of the references and substantially redesign the construction of the references (p. 5, second paragraph of Applicant's response), the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

2. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Ohtombe compares the values received from an A/D conversion to reference values stored in memory (col. 3, ll. 48-52 and col. 4, ll. 5-10) stating later that "[t]he difference of diffuse reflection and Miller surface reflection is used in this process and analysis, in accordance with well known techniques" (col. 4, ll. 36-40). The examiner is relying upon

Yamashita to provide an example of analysis "in accordance with well-known techniques", which Yamashita does in the Abstract and col. 6, ll. 49-67.

3. Furthermore, Applicant argues, "Ohtombe does not need a reference signal"; however, Ohtombe clearly teaches a "threshold value of memory section" (col. 3, ll. 49-51), comparison with memory values (col. 4, ll. 5-10) and "If the value of A/D conversion section 41 is higher than that threshold, the area is detected as a defect..." (col. 4, ll. 49-57, in particular 53-57). The threshold particularly referenced is the value held in memory (see col. 4, ll. 49-51). The reference signal in the claim language is functionally equivalent to the threshold value stored in Ohtombe's memory section.

4. Finally, the reference to previous prosecution of the same references is not persuasive arguments based upon the facts of the instant application.

For the above reasons, the examiner maintains his rejection of the claims.

Claim Rejections - 35 USC § 103

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 96, 97, 100, 101, 104, and 105 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohtombe in view of Yamashita et al., (hereinafter Yamashita), US 5185812.

As per claim 96, Ohtombe teaches:

an illumination source illuminating said substrate (figure1, elements 3 and 4);

first collection optics receiving light and outputting inspection signals (figure 1, element 4);

Ohtombe clearly teaches a "threshold value of memory section" (col. 3, ll. 49-51) and "If the value of A/D conversion section 41 is higher than that threshold, the area is detected as a defect..." (col. 4, ll. 49-57, in particular 53-57). The threshold particularly referenced is the value held in memory (see col. 4, ll. 49-51). Ohtombe discloses everything including a comparator (fig. 2, comparison section 45) for finding defects using a threshold (col. 3, l. 50), but the comparator does not calculate the difference between the inspection signals and a reference signal.

Yamashita teaches in Figure 1B a comparator (data comparator 18)calculating a difference (sub 17) between said inspection signals (1) and a reference signal (reference data converter 16) to identify locations on said substrate (mask 12) suspected of having defects thereupon based on a threshold (data comparator 18 output shows "level min max", col. 6, ll. 49-67), and outputting suspect location data (defect determining circuit 19, fig 4, elements 32 and 33);

Ohtombe goes on to teach:

second collection optics receiving light and outputting images according to said suspect location data (col. 5, ll. 1-12); and

a defect classifier receiving (col. 5, ll. 22) and classifying (defect/no defect) said images (col. 5, ll. 37-42).

It would have been obvious to one of ordinary skill in the art that the combination would modify the comparator of Ohtombe that uses well known techniques of analysis to detect the difference between the inspection signal and a reference signal to detect defects based on a

threshold as taught by Yamashita to efficiently provide detection of known defects without false detection due to a resist process and misregistration (Yamashita, col. 2, ll. 14-16).

As per claim 97, Ohtombe teaches a light source that provides almost horizontal irradiation. However, Ohtombe does not specifically teach that the light is a laser beam. It would have been obvious to one of ordinary skill in the art to use a laser beam as illumination because a laser light source would reduce scattering and provide a more accurate image, particularly when the imaging device has a 1-micrometer resolution in such a system as Ohtombe (col. 5, ll. 20).

As per claim 100, Ohtombe teaches:

wherein said second collection optics comprises an imaging sensor (ITV camera, col. 5, ll. 12-14).

As per claim 101, Ohtombe teaches:

wherein second collection optics further comprises bright field collection optics (col. 5, ll. 12-28, in particular ll. 26-28)

As per claim 104, Ohtombe teaches:

further comprising an image processor (fig. 1, elements 5 and 12) receiving an output from said second collection optics and outputting said images (col. 6, ll. 13-19).

As per claim 105, Ohtombe teaches:

wherein said threshold is an adaptive threshold (col. 3, ll. 45-48 and col. 4, ll. 51-61).

Ohtombe teaches that each section of the wafer as shown in figure 2 has its own threshold value stored in memory. These distinct threshold values requires that the comparison section

adapt its threshold criteria to that stored in memory for each particular section, thereby meeting the limitation of an adaptive threshold.

7. Claim 98 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohtombe and Yamashita, further in view of Maeda et al. (hereinafter Maeda), US 4791586.

As per claim 98, Ohtombe teaches the use of an ITV. However, Maeda teaches:

wherein the first collection optics comprises a plurality of sensors (optical charge coupled devices, figure 2, elements 5a and 5b). It is well known that CCDs are made up of a plurality of image sensors.

It would have been obvious to one of ordinary skill in the art to substitute the CCD of Maeda for the industrial television of Ohtombe and as inputs into the system of Yamashita because of the ready availability of CCDs and the ease of use CCDs.

8. Claims 99 and 102 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohtombe, Yamashita , and Maeda, further in view of Sandland.

As per claim 99, Ohtombe does not specifically teach darkfield imaging. However, Sandland teaches:

wherein said first collection optics further comprises dark field collection optics (col. 19, ll. 31-33, 38-40, 50-51).

It would have been obvious to one of ordinary skill in the art to utilize the teachings of Sandland's darkfield image processing features with Ohtombe, Yamashita, and Maeda's defect detection system so that an image with an acceptable signal to noise ratio can be obtained

(Sandland, col. 19, ll. 25-30). In addition, Sandland teaches the ease of having both brightfield and darkfield imaging within the same apparatus (col. 19, ll. 50-51).

As per claims 102, Sandland teaches:

wherein said dark field collection optics includes a turret carrying a plurality of objectives thereupon (figure 19, element 608, col. 23, l. 63-col. 26, l. 25). It would have been obvious to one of ordinary skill in the art to use the adjustable turret of Sandland in the microscopic system of Ohtombe to increase the speed at which the hand-off positioning of the objective lens due a machine placement being more precise than hand placement of the lenses.

9. Claim 103 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohtombe and Yamashita, further in view of Sandland.

As per claim 103, Ohtombe nor Yamashita specifically teaches a turret for microscopic imaging. However, Sandland teaches:

wherein said bright field collection optics includes a turret carrying a plurality of objectives thereupon (figure 19, element 608, col. 26, l. 25-col. 28, l. 65).

It would have been obvious to one of ordinary skill in the art to use the turret system of Sandland in the defect detection system of Ohtombe and Yamashita to quickly change between brightfield and darkfield aperture/pupil stop combinations to reduce the time required to change optical systems and to insure proper alignment during and after any changes.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin Miller whose telephone number is (703) 306-9134. The examiner can normally be reached on Monday-Friday, 9am-5pm. After December 29, 2003 all telephone communications should be directed to the Examiner's supervisor.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703) 308-6604. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

mem
12/11/03

AMELIA M. AU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600